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DEPARTMENT OF FISH & GAME

Joseph C. Greenley, Director

FEDERAL AID TO FISH & WILDLIFE RESTORATION

Job Performance Report

Project F-71-R-3



REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Job I-a. Region 1 Mountain Lake Investigations
Job I-b. Region 1 Lowland Lake Investigations
Job I-c. Region 1 Stream Investigations
Job I-d. Region 1 Technical Guidance

Period Covered: 1 January 1978 to 31 December 1978

by

William H. Goodnight
Regional Fishery Manager
and
Gregg R. Mauser
Regional Fishery Biologist

June, 1979

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JOB PERFORMANCE REPORT

State of Idaho Name: REGIONAL FISHERY MANAGEMENT
Project No. F-71-R-3 INVESTIGATIONS
Job No. I-a Title: Region 1 Mountain Lake
Investigations

Period Covered: 1 January 1978 to 31 December 1978

ABSTRACT

Time did not permit any high mountain lake investigations during 1978.

RECOMMENDATIONS

1. Assist the Sandpoint District, United States Forest Service in a planned survey of 16 high mountain lakes in the Pend Oreille drainage.
2. Cooperate with Panhandle National Forests personnel in 1979 high mountain lake plants using Forest Service fixed-wing aircraft.
3. Check Forage Lake, St. Joe River drainage, for growth and survival of golden trout released in 1977.

OBJECTIVES

Evaluate selected mountain lakes, their fish populations, angler satisfaction and angler preferences. Use new and existing information on angler use, water quality, species history, spawning potential, stocking success and morphology to develop the potential of these waters for providing diverse angling experiences (species and size of fish).

FINDINGS

Time did not allow any investigations of high mountain lakes by Region 1 personnel during 1978.

JOB PERFORMANCE REPORT

State of Idaho _____ Name: REGIONAL FISHERY MANAGEMENT
INVESTIGATIONS

Project No. F-71-R-3

Title: Region 1 Lowland Lake
Investigations

Job No. I-b

Period Covered: 1 January 1978 to 31 December 1978

ABSTRACT

Kokanee handliners fishing in Coeur d'Alene Lake in 1978 experienced better success than in 1976 or 1977. During peak periods of success anglers on the south end averaged 3.3 kokanee per hour and on the north end 2.8 fish per hour. Modal length of adult year-class kokanee has declined from 270 mm in 1974 to 220 mm in 1978.

Chemical treatment of McArthur Lake in 1977 was not completely effective and yellow perch populations are on the increase.

Kings Lake cutthroat released in lower most Hayden Creek in 1977 grew to 364 mm (14.3 in) by fall and half of these fish were preparing to spawn in 1979 at 4-years of age. They contributed roughly half of the cutthroat over 356 mm (14 in) observed in anglers creels in October 1978.

Hatchery personnel released adipose clipped Kings Lake and left ventral clipped Twin Lakes cutthroat into Hayden Creek from mid-April to early May 1978. These fish were also 2-years of age at release, but in contrast to the release in 1977 were vat-reared and released 3.2 km (2 mi) up Hayden Creek. Only Kings Lake cutthroat from this release were captured in the lake in the fall of 1978. They averaged 280 mm (11.0 in) compared with 301 mm (11.9 in) for the 1977 release but appeared equally as numerous as the hatchery cutthroat the previous year.

A complete management plan for Hayden Lake including background, goals, objectives, facilities and funding was approved by the Commission at their 18 May 1978 meeting.

Authors:

William H. Goodnight
Regional Fishery Manager

Gregg R. Mauser
Regional Fishery Biologist

RECOMMENDATIONS

1. Release marked Kamloops of catchable size in selected lowland lakes in 1979 along with differentially marked domestic catchables and evaluate respective returns to the creel and survival.

2. Place two Lake Merwin traps in Beauty Bay, Coeur d'Alene Lake, during the fall of 1979 to collect kokanee spawn.

3. Trap Sullivan Springs and collect kokanee eggs, incubate and rear for mid-summer releases in 1980.

4. Collect young-of-year bluegill from Bradley Lakes and release in Kelso Lake.

5. Continue to monitor progress of the Hayden Lake program including:

Monitor growth, population size and maturity of Kings Lake cutthroat in broodstock lakes to predict success and prevent problems.

Allocate Kings Lake cutthroat eggs obtained in 1979 on a first priority basis to broodstock maintenance as necessary.

Investigate water source at Clark Fork Hatchery as regards trout embryo incubation.

Feed all westslope cutthroat OMP to enhance survival, growth and egg production.

Recover all waters from spring No. 3 for upgrading of Sandpoint Hatchery. Without additional water this facility cannot be used to capacity for rearing juvenile fish.

Monitor success of rearing 2-year old westslope cutthroat at Mullan Hatchery before committing additional fish and funds there.

Conduct trapping, spawn taking and systematic creel census at Hayden Lake to continue evaluation of program progress.

OBJECTIVES

Obtain data on fish population in lowland lakes in Region 1 including: Use and harvest, spawning trends, stocking success and return to the creel.

Continue implementation of a management plan for Hayden Lake and monitor results to date.

Artificially enhance kokanee populations in Priest and Pend Oreille Lakes by trapping adult kokanee at Sullivan Springs and Coeur d'Alene Lake, taking spawn, artificially incubating and rearing until mid-July when resultant fry are released in Sullivan Springs on Pend Oreille Lake and Granite Creek on Priest Lake.

Renew "feral" Kamloops broodstock at Clark Fork Hatchery by obtaining wild eggs from adults entering the Clark Fork River,

TECHNIQUES USED

Non-systematic creel census, fish population sampling including electro-fishing, netting, trapping, spawning surveys, angling, snorkeling, fish culture and relocation and a variety of contacts with agencies and individuals were used to manage fish populations in several lowland lakes in Region 1 during the study period.

FINDINGS

Coeur d'Alene Lake

We reported in 1978 (Goodnight, Mauser 1978) that angling for kokanee was steadily improving and most observers felt 1977 was the best ever. All indications are that angling in 1978 was better yet. Spot creel checks during the handlining season (period of best angler success) indicate better success in 1978 than in either 1976 or 1977 (Table 1). Between mid-May and 1 July, anglers on the south end of the lake averaged 3.3 kokanee per hour of effort, anglers on the north end averaged 2.8 fish per hour, and the overall average for the entire lake for that period was 3.0 fish per hour (Table 2).

These improved catch rates indicate increasing density of kokanee in Coeur d'Alene Lake. Preliminary sampling by fishery research personnel indicated densities of 134 recruitable-aged kokanee per hectare in Coeur d'Alene Lake. These densities are much higher than those reported for Pend Oreille (70/hectare) and Priest (10/hectare) (Bowler, Rieman 1979). Also indicative of the increasing density of kokanee in Coeur d'Alene Lake is the reduction in modal length of kokanee in the creel and mature spawners.

The modal length of adult year-class kokanee occurring in the catch during the spring handlining season had declined from 270 mm (10.6 in) in 1974 to 220 mm (8.7 in) in 1978 (Fig. 1).

During the same 4-year period the mean length of male and female spawners had declined from 312 mm (12.3 in) and 296 mm (11.6 in) respectively to 262 mm (10.3 in) and 253 mm (10.0 in) (Table 3).

Indications of spawning escapement are difficult to obtain in Coeur d'Alene Lake. Unlike 1977, lack of fall rains prohibited access to small tributaries which in 1977 received high densities of spawning kokanee. Most observed spawning therefore occurred along the lakeshore. There is increasing evidence of kokanee spawning in upper reaches of the Coeur d'Alene and St. Joe drainages. During June concentrations of kokanee occur in the lower reaches of each river. Snorkeling observations during the summer of 1977 indicated their distribution as far upstream as Red Ives on the St. Joe (167 km from lake) and Lost Creek on the Coeur d'Alene (90 km from the lake). Unconfirmed reports were received in the fall of 1977 of kokanee spawning in St. Joe and Coeur d'Alene tributaries.

In late June of 1978 during regular snorkeling of the Coeur d'Alene River,

Table 1. Angling success during best handlining periods 1976, 1977 and 1978, Coeur d'Alene Lake.

	Year	Fish/hour	Fish/angler
North end	1976	1.9	4.6
	1977	1.8	5.1
	1978	2.8	6.4
South end	1976	2.0	5.4
	1977	1.4	8.4
	1978	3.3	8.8
Overall Totals	1976	2.0	5.3
	1977	1.6	6.1
	1978	3.0	7.3

Table 2. Success rates for kokanee handliners contacted during spot checks,
Coeur d'Alene Lake, 1978.

	Date	Anglers	Hours	Kokanee	Fish/hr	Fish/angler
North end	5/17	26	107	433	4.05	16.7
	5/20	48	137	344	2.51	7.2
	6/17	100	224	535	2.39	5.4
	5/27	20	67	84	1.25	4.2
	6/4	80	107	368	3.44	4.6
	6/1	32	51	196	3.84	6.1
Total		306	693	1,960	2.83	6.4
South end	7/1	36	80	67	0.84	1.9
	6/10	39	85	376	4.42	9.6
	5/29	17	53	265	5.00	16.6
	5/28	29	83	310	3.73	10.7
	5/27	32	66	150	2.27	4.7
	5/21	21	58	170	2.93	8.1
	6/8	12	67	299	4.46	24.9
Total		186	492	1,637	3.32	8.8
Totals Overall		492	1,185	3,597	3.04	7.3

Table 3. Average measurements of spawning kokanee, by sex, from Coeur d'Alene Lake, 1954 to 1978.

Year	Males mm	length (in)	Females mm	length (in)	Year	Males mm	length (in)	Females mm	length (in)
1954	409	(16.1)	381	(15.0)	1964	279	(11.0)	269	(10.6)
1955	371	(14.6)	361	(14.2)	1965	292	(11.5)	282	(11.1)
1956	--		--			--		--	
1957	399	(15.7)	343	(13.5)	1967	318	(12.5)	302	(11.9)
1958	363	(14.3)	361	(14.2)	1973	329	(13.0)	309	(12.2)
1959	335	(13.2)	330	(13.0)	1974	312	(12.3)	296	(11.7)
1960	340	(13.4)	325	(12.8)	1975	276	(10.9)	276	(10.9)
1961	328	(12.9)	315	(12.4)	1976	--		--	
1962	292	(11.5)	287	(11.3)	1977	262	(10.3)	259	(10.2)
1963	274	(10.8)	269	(10.6)	1978	262	(10.3)	253	(10.0)

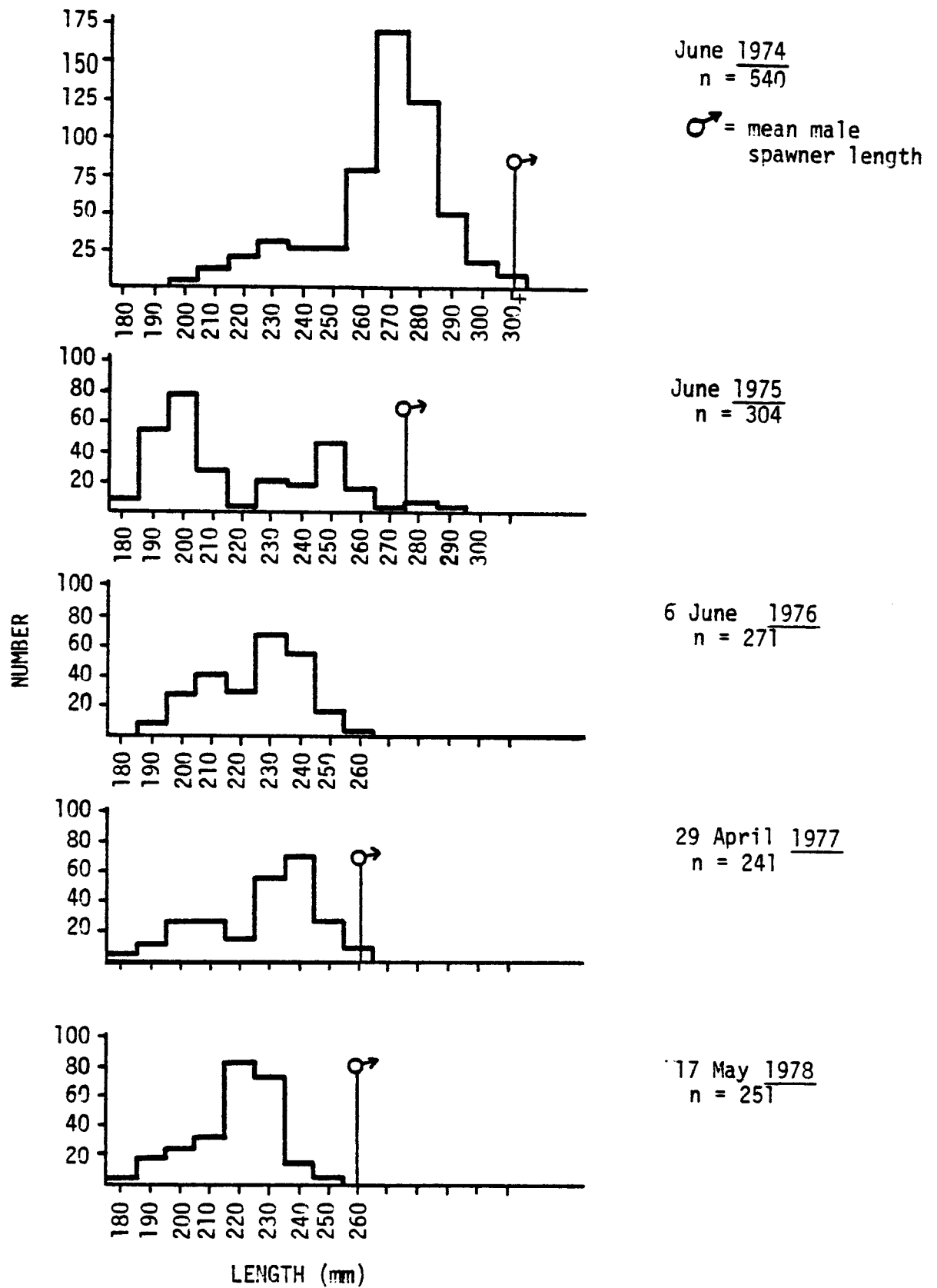


Figure 1. Length frequency of kokanee from the creel during peak fishing periods, 1974 through 1978, Coeur d'Alene Lake.

we found most holes below Lost Creek contained 100-200 kokanee. Also during June a significant kokanee fishery developed on the lower Coeur d'Alene River in the vicinity of the Cataldo Mission and limits {25 kokanee) were a common occurrence.

During the fall of 1978 we received confirmed reports of kokanee spawning in Pine Creek (Coeur d'Alene River tributary) and Big Creek (St. Joe River tributary). During research studies in 1979 attempts should be made to determine the level of significance of spawning in these drainages. We now assume that shoreline spawning provides the bulk of fry contributions to Coeur d'Alene Lake populations.

Prior to the mid 1970s kokanee angling success in a given year seemed to be directly related to the level of hatchery releases four and five years previous. It was generally felt that shoreline spawning success was limited and that the fishery was sustained through these hatchery releases. Beginning in 1970 releases of early-spawning kokanee were made in an attempt to establish these stream spawning stocks and create a self-sustaining kokanee population. Through 1976, 4,666,349 early spawning kokanee fry were released in tributaries to Coeur d'Alene Lake (Table 4). Runs of significant size observed in a few tributaries since 1976 indicates little contribution of these releases to the fishery. Releases of early-spawners were terminated in 1976.

Preliminary echosounding and trawling data indicates total kokanee densities in Coeur d'Alene Lake of 686 kokanee/hectare. This would represent a total kokanee population near 7,000,000 fish. Recent hatchery releases of late-spawning kokanee (Table 4), could not be responsible for population levels indicated. The conclusion reached is that current populations are self-sustaining and further hatchery supplementation is not called for.

In an attempt to obtain kokanee eggs, we placed a Lake Merwin trap in Beauty Bay on 30 November 1978. The trap was very effective in capturing mature, gravid kokanee females. It caught very few green or spent fish and females outnumbered males caught about 2:1. Peak captures occurred during the first week of operation (400-750 kokanee per night). During December and through January we trapped 5,460 kokanee and collected 1,316,020 eggs. Fry resulting from these eggs will be allocated to Priest and Pend Oreille Lakes. Species also trapped include largemouth bass, black crappie, yellow perch, brown bullhead, cutthroat trout and tench.

Pend Oreille Lake

Kamloops Broodstock

The goal of our Kamloops program is to establish a run of fish to Clark Fork Hatchery. Establishment of such a run will enable us to retain genetic integrity in our management programs and avoid genetic selection and ultimate loss of characteristics unique to Gerrard stock rainbow. This goal is to be facilitated by the development of a feral broodstock. In 1973 and 1974 eggs were taken from wild Spring Creek spawners. The resultant fish now form the nucleus of our broodstock.

Additional eggs were obtained from wild fish in 1976. On 21 and 22 March 1978, we collected from the Clark Fork River, via hook and line, five males and

Table 4. Number of kokanee planted in Coeur d'Alene Lake and/or tributary streams since introduction.

Year	Total number of fish	Year	Total number of fish
1937	35,000	1958	608,000
1938	150,000	1959	920,000 *(488,000)
1939	259,000	1960	1,128,000
1940	-	1961	1,304,000
1941	187,200	1962	750,000
1942	854,690	1963	226,090
1943	-	1964	113,856
1944	-	1965	615,317
1945	-	1966	725,305
1946	-	1967	1,166,422
1947	42,000	1968	1,004,857
1948	100,000	1969	448,368
1949	219,150	1970	1,089,820 *(639,345)
1950	202,500	1971	1,322,144 *(506,664)
1951	533,600	1972	666,528 *(144,816)
1952	175,000	1973	*(209,000)
1953	126,000	1974	*(792,455)
1954	124,000	1975	*(1,334,450)
1955	365,400	1976	2,240,119 *(1,039,619)
1956	314,488	1977	354,485 *(0)
1957	832,896		

*Parenthesis includes the number of the total fish that were from a strain of early spawning kokanee.

three female Kamloops which we transferred to Clark Fork Hatchery. These fish provided 23,532 eggs which will further supplement existing 1973, 1974 and 1976 year classes of broodstock.

Less than 25% of the 1973 year class matured in April of 1978 at 5 years of age. These fish yielded 232,770 eggs. These eggs were fertilized using wild males from the Clark Fork River. Egg quality was noted to be poor and we experienced only 29.8% eye-up.

Anderson (1978) reports 19% of wild Kamloops spawn prior to 6 years of age. We are therefore encouraged that retention of the unique Kamloop characteristic of late maturity can be retained in a hatchery environment and that shifts noted in age-at-maturity in our previous broodstock (which ultimately spawned at age 3) was due to genetic selection and not environmental factors.

We anticipate significantly higher numbers of eggs from the broodstock in 1979 as 60% of the 1973 year class should be mature along with about 20% of the 1974 year class (Anderson 1978). Yearling survivors from the 1978 year class will be the first production from this broodstock available for release in 1979.

Kokanee Enhancement

Research on Lake Pend Oreille has resulted in the recommendation for a kokanee enhancement program to provide additional recruitment. Any significant program will be contingent on an adequate source of eggs. As we reported previously, it is our goal to enhance the Sullivan Springs run through artificial incubation and late releases to a size which will provide 10-50 million eggs annually (Goodnight, Mauser 1978).

In 1974, 1976 and 1978 eggs were taken from this run, incubated in North Idaho hatcheries and resultant fry released the following summer in Sullivan Springs.

<u>Date released</u>	<u>Location</u>	<u>Number</u>
5/8-6/19/75	Sullivan Springs	629,222
7/11-7/28/77	Sullivan Springs	757,720
6/22-8/4/78	Sullivan Springs	1,735,251

During November and December, 1978, we collected 1,434,310 eggs at Sullivan Springs. Resultant fry will be released at that site in the summer of 1979.

We have a couple of reasons to be encouraged about enhancing run size at Sullivan Springs. During this past run we expected to see some indication of enhancement as a result of releases of 629,222, 1974-year-class fry in 1975. In 1974 we counted 13,549 kokanee through the weir in Sullivan Springs. In 1978 we spawned an estimated 16,875 fish. This indicates even though peak abundance estimates of total kokanee numbers in 1978 were roughly one half of what they were in 1974 (echosounding, trawling), the Sullivan Springs run was greater than the 1974 run.

Another indicator of success of these late releases in Sullivan Springs is

the proportion of total fall young-of-the-year they represent in the lake. 12-15% of fry sampled in fall trawling were fry released in Sullivan Springs that summer (as indicated by tetracycline marking).

Hayden Lake Program

The Hayden Lake program involves a long list of hatchery support functions to generate a reliable egg source for other waters and for restoration of the fishery itself. Modest wild sources of eggs will be used to rear hatchery broodstocks and to maintain traits essential for survival in the natural environment. Hatchery broodstocks must produce an estimated minimum of 1 1/4 million eggs to provide 300,000 II+ westslope cutthroat for release into Hayden Creek. Adequate hatchery space for all phases, rearing ponds to raise 2-year old cutthroat to about 152 mm (6 in) in length, and a permanent weir to trap returning adults, are essential elements of the plan. As it looks now we will eventually rely primarily, if not exclusively, on Kings Lake cutthroat as the stock of fish for this program. In the interim we are using eggs from many sources to attain program goals.

Kings Lake Cutthroat

In 1945 the state of Washington obtained westslope cutthroat eggs from Granite Creek, tributary of Priest Lake, Idaho. These fish were used to stock Kings Lake, one of the first bodies of water in the West successfully treated with rotenone (to remove brook trout). Since that time Washington personnel have used the 20-ha (50-acre) lake to supply eggs for other waters. The electrophoretic patterns of Kings Lake cutthroat show some slight rainbow patterns probably present in the parent stock. Kings Lake fish are westslope cutthroat stock whose purity is ample for most fishery restoration projects (Eric Laudenslager, UC Davis, personal communications). We received 100,000 eggs from Kings Lake in 1975 and 1976 to establish a westslope cutthroat program.

Hungry Horse Cutthroat

Montana obtained eggs for a westslope cutthroat broodstock from tributaries of Hungry Horse Reservoir in 1965 and 1967. This is the only known pure stock of westslope cutthroat used for fish cultural purposes and has been maintained 13 generations in the hatchery environment since the parent stock was obtained from the wild. Montana has used these fish successfully for introductions and maintenance stocking statewide. Eventually surplus eggs from this stock could be used for experimental releases in Pend Oreille Lake. Presently every available egg from westslope cutthroat stocks is needed to attain program goals for Hayden Lake. Montana gave us surplus brood fish in 1977 and 1978.

Twin Lakes Cutthroat

In 1976 we obtained 108,000 Twin Lakes cutthroat fry from the state of Washington. Reportedly parent stocks for these fish came from Lake Chelan in the early 1900s augmented by any cutthroat native to Twin Lakes. They are basically a westslope cutthroat stock.

Fish Lake Cutthroat

In 1978 we discontinued a marginal westslope cutthroat broodstock program

at Clark Fork involving cutthroat from Fish Lake, Idaho, a mountain lake at the headwaters of Lake Creek, tributary of the North Fork of the Clearwater River. These fish were outlet spawners cultured over an 8-year period in an attempt to obtain westslope cutthroat eggs for North Idaho waters. During that time these fish produced a total of 332,556 eyed eggs. Early egg takes were 50,000 or fewer green eggs annually due to small size of females. Eye-up success in later years ranged from 33-60%, possibly due to inadequate feeds, advanced age of the fish, or some problem with the water supply at Clark Fork for incubation purposes. Small numbers of surplus broodstock and yearlings were released in Hayden Lake in 1978.

Broodstock Lakes

On 25 October 1978 we used 3,360 Kings Lake cutthroat from the 1976 year-class to stock a 9.3-ha (23-acre) broodstock lake purchased and treated by the Department in 1977. The fish were 152-254 mm (6-10 in) in length and in excellent condition. We expect to trap the inlet of this productive body of water located in south-central Idaho to provide a supplemental egg source of wild Kings Lake cutthroat as needed.

On 26 July 1977 hatchery personnel released 1,672 Kings Lake cutthroat into an unproductive 3.8-ha (9.5-acre) lake in North Idaho which is surrounded by private land. These fish were from the 1975 year-class. We monitored their growth as follows:

<u>Date</u>	<u>Average total length (mm)</u>	<u>Age</u>
26 July 1977 (release)	160	II+
5 October 1977	199	II+
8 May 1978	217	III+
1 September 1978	267	III+

Though a few males were ripening in fall 1978 it appears the bulk of these fish will reproduce in 1980 at 5 years of age and about 300 mm (11.8 in). Beginning then we hope to obtain a minimum of 75,000 eggs annually to maintain this population and replenish hatchery broodstocks as necessary. We do not anticipate the availability of many eggs surplus to these needs. We plan to use a Lake Merwin trap to obtain and hold fish for spawning as the lake has no surface inlet. This lake should provide some good information on stocking rates for very sterile bodies of water.

On 4 May 1978 we released 783 Kings Lake cutthroat from the 1976 year-class into the lake but have obtained no fish of this age-class in samples to date. They averaged 114 mm (4.5 in) at release.

Hatchery Broodstocks Kings

Lake Cutthroat

67,056 Kings Lake cutthroat from the 1975 year-class were placed in Rochat Creek rearing pond in early July 1976. About 35,000 two-year olds were removed 21 April 1977 for Hayden and broodstock lakes. On 15 March 1978 we removed the

remaining 1,186 fish to Clark Fork Hatchery brood ponds. The average sizes of these fish when checked were:

<u>Date</u>	<u>Average total length (mm)</u>	<u>Age</u>
8-14 July 1976	64	I+
21 April 1977	118	II+
1 October 1977	231	II+
15 March 1978	289	III+

These fish produced 42,623 eggs as 3-year olds in 1978, none of which were viable.

To alleviate losses due to intra-pond predation we refined our broodstock rearing program by placing 15,400 graded Kings Lake cutthroat from the 1976 year-class in Rochat Pond in mid-April 1978. We also switched the program to OMP to minimize non-feeding individuals and maximize overall growth. As mentioned previously 3,360 of these fish were removed 25 October 1978. Growth patterns during 1978 were as follows:

<u>Date</u>	<u>Average total length (mm)</u>	<u>Age</u>
7-19 April 1978	142	II+
15 September 1978	214	II+
25 October 1978	212	II+
8 November 1978	227	II+

None of the 1976 year-class were approaching maturity in 1978.

Hungry Horse

In 1977 we received approximately 1,240 westslope cutthroat that were 3, 4, 5 and 6 years old from Arlee Hatchery in Montana. These broodstock were in excess of what their facility could hold and were donated to help us meet our need for eggs. Three-hundred and ninety-six females of this group produced 628,992 eggs just prior to transfer to Clark Fork. There were in excess of 500 females which averaged about 0.9 kg apiece and 1,588 eggs/female. Only 100 females produced eggs in 1978. The total egg take was 133,340. Up until mid-summer 1978 these were on Silver Cup broodstock feed with triple vitamin C. At that time they were switched to Rangen's feed.

In 1978 we received about 1,997 3- and 4-year old Hungry Horse cutthroat from Arlee Hatchery. These fish which averaged 0.4 kg (2 lb) were placed in a pond at Mullan Hatchery and fed Moore Clark and Rangen's state bid feeds. In early fall they suddenly lost condition and were approaching severe emaciation. We transferred them to Clark Fork Hatchery in September and placed them on OMP. Within several weeks there was a noticeable improvement in their condition.

1978 Releases and Results

1975 Year-Class

As reported last year we released 30,000 adipose clipped Kings Lake cutthroat into lower Hayden Creek on 21 April 1977. These fish were pond reared. Apparently all entered the lake by late summer and grew as follows:

Date	Average total length	Age
21 April 1977 (release)	118 mm	II+
September-November 1977	301 mm	II+
April-June 1978	342 mm	III+
September-November 1978	364 mm	III+

Half of these hatchery-origin cutthroat observed in anglers creels in fall 1978 were maturing.

From angler interviews Kings Lake cutthroat from the 1975 year-class made up 50% of the cutthroat caught and one-third of all trout over 356 mm (14 in).

1976 Year-Class

Between 14 April and 6 May 1978 we released 36,982 adipose clipped Kings Lake cutthroat into Hayden Creek off the second bridge upstream. Another 11,850 Twin Lakes cutthroat averaging 109 mm (4.3 in) in size with a left ventral clip were released between 20 and 25 April. These fish were all reared in vats at Sandpoint Hatchery. Individuals of both stocks remained in Hayden Creek into the fall. Only Kings Lake cutthroat were recovered in Hayden Lake and exhibited this growth:

<u>Date</u>	<u>Average total length (mm)</u>	<u>Age</u>
14 April-6 May 1978 (release)	115	II+
September-November 1978	280	II+

They appeared to exhibit more size/condition variation than the 1977 release but seemed equally numerous their first fall in the lake.

1977 Year-Class

On 1 December 1978 we made a direct release of 3,915 surplus Fish Lake cutthroat into Hayden Lake near the outlet. These fish were in excellent condition, were marked with a left pectoral clip, and averaged about 114 mm (4.5 in) in size.

McArthur Lake

Subsequent to treatment of McArthur Lake in 1977, we released 132,702 young-of-year brook trout. During 1978, 101,816 young-of-year brook trout were released.

Five thousand catchable-sized rainbow were released in 1978 on a one-time basis to provide a fishery until brook trout reach catchable size.

During 1978 it became apparent that eradication was incomplete and significant numbers of pumpkinseed sunfish and yellow perch were present in the lake. Current plans are to continue with large annual releases of brook trout to attempt population establishment in the face of competing species. If this appears infeasible, at a later date we may attempt another treatment preceded by a total lake drawdown to facilitate a total eradication.

Bluegill Introductions

Region 1 is the only region in the state which does not have bluegill sunfish. However, pumpkinseed sunfish inhabit essentially every major lowland water in the region. Pumpkinseed have a low growth potential and reach a maximum size of 203 mm (8 in) and most specimens caught in Region 1 average 102-152 mm (4-6 in). Our experience in South Idaho is that wherever pumpkinseed and bluegill co-exist, bluegill dominate and exhibit much greater growth. We feel the introduction of bluegill in selected waters in Region 1 would provide more enjoyment to casual anglers who now rely on pumpkinseed. Bluegill would also, hopefully, provide a fish in a package more readily utilized for food.

On 4 May 1977 the Commission approved the introduction of bluegill to Kelso Lake on an experimental basis. On 22 April the Boise Valley Fly Casters collected 175 bluegill from Sand Dunes Lakes near Bruneau, Idaho, which we transferred by hatchery truck to a barren private pond near Naples, Idaho, on 23 April. It was felt that releasing 175 fish (many of which were mature adults) in a small 2 ha, (5 acre) private pond presently barren of fish would produce better results than releasing the fish directly in Kelso, 24 ha (60 acres). After establishment of bluegill populations the private pond will serve as a source of bluegill for Kelso introductions and other possible introductions.

We plan to trap young-of-the-year bluegill in the spring of 1979 for the first releases in Kelso Lake.

JOB PERFORMANCE REPORT

State of Idaho Name: REGIONAL FISHERY MANAGEMENT
INVESTIGATIONS

Project No. F-71-R-3

Title: Region 1 Stream Investigations

Job No. I-c

Period Covered: 1 January 1978 to 31 December 1978

ABSTRACT

Data collected under Project F-73-R-1, subproject IV, Study VI, Job I (Kootenai River Fisheries Investigations) is summarized in this job narrative and a separate report will not be submitted.

We captured 27 sturgeon by hook-and-line from the Kootenai River in 1978. A mandatory sturgeon tag will be required for anglers seeking sturgeon on the Kootenai in 1979.

Author:

William H. Goodnight
Regional Fishery Manager

RECOMMENDATIONS

1. Early in 1980, initiate a telephone survey of Kootenai River sturgeon tag holders to assess angler effort and harvest for that fishery.
2. Conduct snorkeling and test angling to assess results of brown trout introductions in the lower Priest River and tributaries.
3. Conduct population sampling on the Spokane River to assess status of wild rainbow in relation to exploitation (i.e. year-round fishing).
4. Snorkel established transects on the Moyie River to evaluate the status of wild rainbow populations.
5. Snorkel established transects on the upper Coeur d'Alene and upper North Fork of the Coeur d'Alene River to assess response of cutthroat populations to restrictive regulations instituted in 1975.

OBJECTIVES

Monitor fisheries on major streams in Region 1.

TECHNIQUES USED

We used hook and line sampling, creel census and visual observations to obtain information on major fisheries in Region 1.

FINDINGS

Kootenai River Sturgeon

During 1978 we continued sturgeon population sampling in the Kootenai River and captured 27 sturgeon (Table 1). These captures included three fish which had been previously marked. We measured all fish captured (total length, front and rear girth) and when feasible weighed them to the nearest pound. Sections of pectoral fin-rays were removed for aging purposes. All fish were tagged with floy anchor tags on the dorsal mid-line and tattooed with a corresponding number on the dorsal lobe of the caudal fin.

On 8 April 1978 a Bonners Ferry angler captured a 170-cm (67-in) sturgeon which had been captured and marked by British Columbia fisheries workers in July of 1977 near the mouth of the river at Kootenay lake. This represents an upstream movement of some 64 km (40 mi) and documents international movement of sturgeon within the Kootenai River.

We examined the stomachs of 11 angler caught sturgeon from the Kootenai. Six stomachs were empty and three contained dipteran larvae and detritus material. One contained a single mayfly larvae. The stomach of one 142-cm (56-in) sturgeon contained the skeletal remains of a 305-356 mm (12-14 in) fish. Most stomachs were void of many food items and some of this is due to the method of stomach removal. In the future we will attempt to remove the entire alimentary canal as it appears significant food storage occurs ahead of the stomach.

Table 1. Fish marked during sturgeon population sampling, Kootenai River, 1977 and 1978.

Length	Age	Front girth	Rear girth	Tattoo No.	weight(lb)		Remarks
					Est.	Actual	
<u>Date:</u>	11/12/77	<u>Rock Creek</u>					Location: Rock Creek
86"	32	33"	27.5"	0001	157.4	--	
46"	19	17"	15.5"	0002	24.0	--	
48"	18	15.5"	14.5"	0003	21.6	20.0	
40.5"	19	15.5"	13.5"	0004	17.0	15.0	
<u>Date:</u>	3/23/78	<u>Rock Creek</u>					Location: Rock Creek
48"		16"	14"	0005		21.0	
44"		14h"	134"	0006		16.0	
53"		174"	152"	0007		26.0	Recaptured 6/17 Island Slack Hole on South Bank
46"		144"	134"	0008		17.0	
42"		13h"	12"	0009		12.0	
51"		16 2"	16"	0010		24.0	
<u>Date:</u>	3/30/78	<u>Krauses Hole</u>					
39"		13"	12"	0011		12.0	
<u>Date:</u>	3/30/78	<u>Rock Creek</u>					
30½ "		10"	9"	0012		5	
75"		27h"	23k"	0013	60+		
64"		23"	202"	0014		47	
86"		33"	27h"	0015			
41½"		14h"	13"	0016		14	
55"		19 2"	182"	0017		36	

Table 1. Continued.

Length	Age	Front girth	Rear girth	Tattoo No.	Weight (lb)		Remarks
					Est.	Actual	
Date: 4/26/1978 Rock Creek							
42½"		142"	13¼"	0018			16
44½"		14¾"	14"	0019			17
44½"		15"	14½"	0020			19
Date: 6/20/78 Krauses Hole							
202"				10003	(Yellow 00003)	1	
Date: 6/20/78 Ferry Island							
20"		7"	52"	10004	(Yellow 00004)	1	
30"		9¾"		10005	(Yellow 00005)	5	5
Date: 7/11/78 Ferry Island							
Recapture #10003 (202") good healing of finray--no tag irrit. poor ink in tatoo.							
Date: 8/9/78 District 5 Hole							
40.5"		14.75"	13.5"	10006	(Yellow 00006)		15
46.0"		17"	15"	10007	(Yellow 00007)		24
78.0"		27"	25"	10008	(Yellow 00008)		?
Date: 8/11/78 District 5							
43.0"	16		131 "	10009	(Yellow 00009)		18
40.5"	14		13"	10010	(Yellow 000010)		14

Table 1. Continued.

Length	Age	Front girth	Rear girth	Tattoo No.	Weight (lb)		Remarks
					Est.	Actual	
<u>Date: 8/16/78</u>		<u>Krauses</u>					
25"		8"	7.5"	10011	(Yellow 00011)		4
<u>Date: 8/16/78</u>		<u>Big Bend below Krauses</u>					
22"		7.5"	7"	10012	(Yellow 00012)		3
22.5"		7.75"	7"	10013	(Yellow 00013)		3
<u>Date: 9/15/78</u>		<u>Recaptured at District 5 Hole</u>		10011	(Yellow 00011)		

In 1978 we instituted a mandatory sturgeon tag for the Kootenai River. Any person angling for sturgeon in the Kootenai will have to have a valid sturgeon tag in possession. This mandatory tag will provide us with an accurate account of those angling for sturgeon and provide for later contact to assess angler effort and harvest.

Lower Priest River Brown Trout

A decision was reached in 1976 to introduce brown trout to the lower Priest River. To date the following releases have been made in tributaries to lower Priest River:

<u>Year</u>	<u>Number</u>	<u>Age</u>
1976	21,500	yearling
1977	65,484	young-of-year
1978	41,508	yearling
	53,156	young-of-year

Sandpoint Hatchery has 73,366 yearling and 236,585 young-of-year brown trout that are destined for release in 1979.

JOB PERFORMANCE REPORT

State of Idaho Name: REGIONAL FISHERY MANAGEMENT
INVESTIGATIONS

Project No. F-71-R-3

Title: Region 1 Technical Guidance

Job No. I-d

Period Covered: 1 January 1978 to 31 December 1978

ABSTRACT

Region 1 management personnel provided private individuals, organizations and state and federal agencies with technical guidance and advice on projects associated with or having impacts on the fishery resource or aquatic habitat in Region 1. This guidance included written comments on 147 documents.

A significant amount of time was spent providing technical guidance to the U.S. Bureau of Land Management, the U.S. Environmental Protection Agency and private consultants on the Northern Tier pipeline proposal.

Author:

William H. Goodnight
Regional Fishery Manager

OBJECTIVES

To provide technical guidance to public and private individuals or agencies on matters pertaining to fisheries within Region 1.

TECHNIQUES USED

Through personal contact, project and document review and field inspections, we made comments and provided advice on projects or activities associated with or impacting the fishery resource or aquatic habitat of the region.

FINDINGS

During 1978, Region 1 management personnel responded to 147 written requests for comments from state and federal agencies including:

U.S. Army Corps of Engineers	24
U.S. Forest Service	14
U.S. Environmental Protection Agency	4
Idaho Department of Lands	54
State Clearinghouse	12
Idaho Department of Transportation	9
Idaho Department of Water Resources	20
Miscellaneous	<u>10</u>
Total	147

Northern Tier Pipeline

We spent a significant period of time providing technical consulting to the U.S. Fish and Wildlife Service, the Bureau of Land Management and private consulting firms regarding the proposed Northern Tier crude oil pipeline which will traverse Region 1.

Our most significant initial concern involved a route segment which would involve twenty-four crossings of the Coeur d'Alene River between the confluence of the South Fork and Pritchard. Due to our expressed concerns for that segment, along with concerns expressed by the public and other state agencies, the Northern Tier Pipeline company abandoned that route in favor of a route up Jackass Ridge.

Panhandle Lake Workshops

During 1978, the Kootenai Environmental Alliance received a grant from the U.S. Environmental Protection Agency to provide the public information regarding environmental problems associated with panhandle lakes. We assisted in developing

an informative citizens handbook and participated in three public workshops discussing lake problems in North Idaho.

Department of Public Lands Workshops

We participated in two workshops conducted by the Idaho Department of Public Lands involving presentations on erosion impacts on fisheries and the impacts of logging and road-building on fisheries.

LITERATURE CITED

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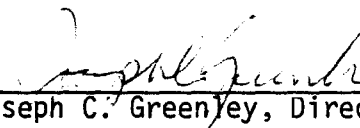
Submitted by:

William H. Goodnight
Regional Fishery Manager

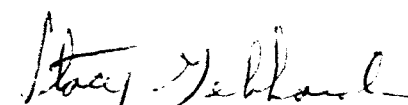
Gregg R. Mauser
Regional Fishery Biologist

Approved by:


IDAHO DEPARTMENT OF FISH AND GAME



Joseph C. Greeney, Director



Stacy Gebhards, Chief
Bureau of Fisheries



Jerry Mallet
Fishery Research Supervisor
Bureau of Fisheries